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Business Support Measures in the State Budget Strategy for 2007-2013[1]

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Executive Summary

The changes that have recently taken place in Estonia have been relatively typical of developing countries: in the course of fast export- and consumption-based growth, the volume of technology and skills in the economy has decreased. In other words, Estonia's economic growth to date has not been able to create sufficient value to balance uneven development.

The authors proceeded from the position that industry and knowledge-based services are the primary engine for sustainable development. In order to analyze the innovation problems of Estonian businesses, in May-June of 2005, a survey was conducted in Estonia among 810 low-, middle- and high-technology manufacturers, resource-based industrial companies, and companies that provide knowledge-based services. The results of the survey indicate that innovations are introduced but mostly products and services are being improved, while operational, organizational and marketing innovations are relatively less important. Development activities that are not related to subcontracting activities are limited.

Very little innovation-related cooperation with other companies is taking place. The greatest barrier is the fear of competition, i.e. instead of possible cooperation; competitors will achieve a better position. Cooperation (between companies; with institutions dealing with research and development (R&D)) is therefore of minimal importance, and this is not seen as a problem, which in turn, means that the positive impact of cooperation (sharing the risks related to innovation) is not understood.

The problems that entrepreneurs see as hindering innovation, and thereby growth (financing, qualified workforce, lack of markets) need long-term and systematic solutions or rather a set of solutions, which would solve the systematic and structural problems of Estonian industry. Estonia must essentially create an industrial policy that has been lacking to date, otherwise, even with high figures for economic and export growth, a solution will not be found for very unbalanced domestic development, and consequently, a large part of today's policies supporting innovation and R&D activities will fail.

Based on the aforementioned, the authors make recommendations for using EU structural funds in a way that enables industrial and knowledge-based service enterprises to move into activities and fields that allow rapid increases in productivity and inter-company cooperation as a results of which positive feedback mechanisms are created.

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Dear Reader,

The distribution of the Structural Funds of the European Union has now become almost a topical issue and even successful businesses do not hesitate to apply for the government support. The more active entrepreneurs have followed the economic developments and have formed their own respective viewpoints and expectations.

Currently the new actions are planned to support the entrepreneurship during 2007 – 2013. A tremendous change concerning all parties has taken place during last couple of years regarding the access to the information and the better understanding of ones role. The officials are experienced both in planning and administration of the EU funds and the spokesmen of the entrepreneurs know better, what kind of feedback is expected and how to take a stand in defense of their business interests in the consultation process.

The current policy analysis is based on in-depth research that was conducted by the request of the representatives of the entrepreneurs. The aim is to develop suggestions based directly on the viewpoints of the entrepreneurs and on the recent analysis of the entrepreneurship problems. The positive approach of the private sector to development of knowledge based policies is a very positive and even ground breaking trend on the Estonian political scene.

The above mentioned trends enthuse in particular PRAXIS, who has now worked for five years introducing the principles of politics, based on the research, analysis and participatory democracy.

The results of the research can be of interest to both entrepreneurs and those involved directly in policy making. We are confident that the suggestions based on this work are worth of being applied in the decision-making process in the near future. This would help the Estonian businesses become more competitive both in the European and world markets.

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Introduction

Industry was, is, and will remain the primary engine for sustainable development in a free market economy. This results from a confluence of the following circumstances: asymmetric competition (it is often quite difficult for competitors to know how one or another product is exactly made; and this provides a competitive edge) and possible effects of scale (when production volume increases the production cost per unit decreases) create a precondition in industry for creating great added value, for quick growth of the volume of capital, technology and skills, expressed in turn by greater profits, increased salaries, and higher living standards. Since this growth is often related to different suppliers and other cooperation partners – more complicated products are always developed in cooperation with other companies – then this growth has a positive feedback effect through the entire value chain, increasing profits, wages, etc.[3] At the same time, a similar positive development circle is missing in the service and agricultural sector and this for two simple reasons: in these sectors, competition is almost always symmetrical (for instance, it is very difficult to conceal the nature of some service from the competition in the finance sector; in agriculture as well, the conditions for growing potatoes are more or less the same in Tõrva and Narva) and the effects of scale are almost impossible to achieve (a teller must physically serve every client; more or less the same quantity of grain will grow from one seed). Therefore, all the technological and skill-based competitive advantages are available to practically all the market participants in the service and agriculture sector, which makes price competition very strong and large growth – and thereby also higher profits and increased wages – very complicated, since the profits are achieved by the technology manufacturers. The so-called knowledge-based services, which are often related to info technology, design, and entrepreneurial services, and in which conditions similar to industry often dominate, are becoming an exception to this rule.

Manufacturing industry and knowledge-based services are the primary engine for sustainable development.

Due to the aforementioned, industrial development has always been the basis for a country's prosperity. This has been simplified by the fact that the primary input for industrial development has been people and their skills. These can also be developed in small countries and/or those that have no climatic or geographic advantages. Based on the history of economic policies of prosperous countries, we can emphasize the following set of policies, which we concisely define as development policies (in today's context, this includes industrial, innovation, education, and R&D policies), and **the objective of which has been to enable the private sector to move into fast-developing, with great added value and capital, skill, and technology intensive sectors**. Necessary are: a) skills, b) technology, c) capital, d) markets. Depending on the country, successful development policies have always found the proper balance of the four aforementioned elements, corresponding to the development risks and problems that actually exist.[4]

The objective of the research is to propose recommendations for development of business support instruments.

The structural funds of the European Union must help member countries to eliminate their weakest points. Therefore, the single programming document should essentially be a description of the respective country's development policy.

Based on the aforementioned, industry must, in one way or another, be at the centre of any development policy. Naturally, the question is how to develop the industry of a specific country. The following attempts to provide an answer to this question within the Estonian context and the framework of using new European Union structural funds (so-called financial outlook for 2007-2013). The objective of the research is to develop proposals for priorities and measures for the support of business, and their hierarchy, in the single programming document for 2007-2013.

Survey was conducted among 810 enterprises.

3 – Erik S. Reinert, The Role of the State in Economic Growth, Journal of Economic Studies, vol. 26, 4/5, 268-326, 1999. In Estonian, see primarily Erik S. Reinert, „Riigi roll majanduskasvus", Teadmistepõhine riik ja majandus, Riigikantselei, 2004.
4 – *Ibid.*

78% of the companies have introduced innovations.

The recommendations are based on a survey conducted in May-June of 2005 among 810 low-, middle- and high-technology manufacturers, resource-based industrial companies, and companies that provide knowledge-based services.

In the first part the survey results are analysed and in the second part recommendations for redesign of the business support measures as well as for introduction of new instruments are made.

1. Innovation in manufacturing and knowledge-based services in Estonia

Less attention is paid to operational, organizational and marketing innovations.

1.1. Summary of company innovativeness[5]

The research revealed that the percentage of innovative companies involved in the survey was very high – 78% of the companies answered that they have introduced innovations in at least one area (new products or services, and operational, organizational, or marketing innovations), whereas the percentage was a bit lower among service companies (75%) than among industrial enterprises (83%).

During 2002-2004, the majority of the responding companies introduced innovations in the field of products and services, whereas the percentage of operational, organizational, and marketing innovations was relatively small.

67% of the questioned companies plan to keep developing innovations in at least one field in 2005-2007 and 37% also plans totally new innovations in at least one field. Moreover, the continuation of today's trends – emphasis on product and service innovation, and less attention to

Figure 1. *The percentage of companies introducing innovations in 2002-2004, by fields of activity and types of innovations*

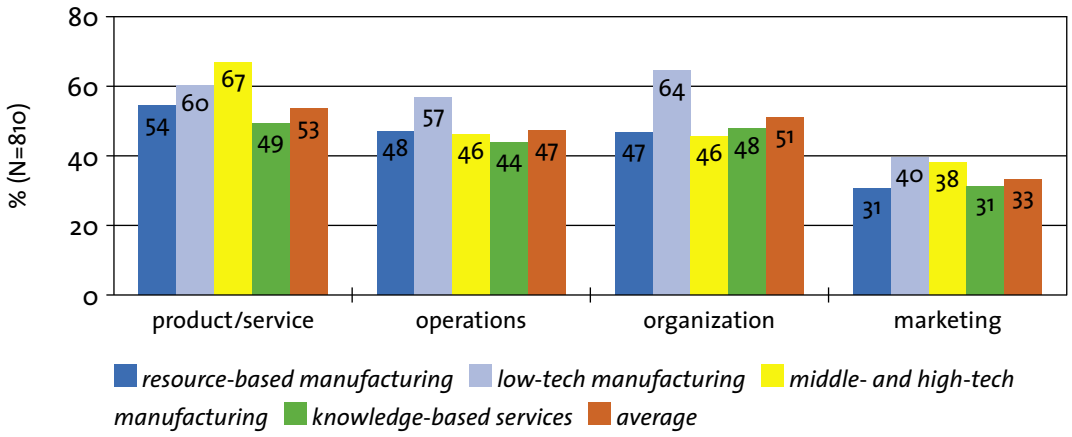
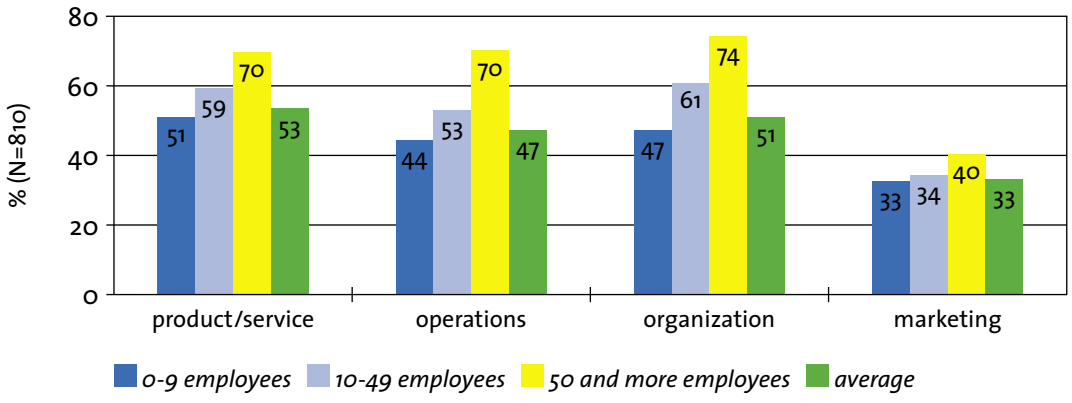


Figure 2. *The percentage of companies introducing innovations in 2002-2004, by size and types of innovations*



5 – Overview of the methodological matters is available in the full text of the analyses from the webpage of PRAXIS Center for Policy Studies, www.praxis.ee.

operational and organizational innovation – can be noticed.

As in earlier studies,[6] the fact that larger companies introduce more innovations than smaller ones was proven; whereas the greatest difference is that, the largest companies pay the most attention to organizational innovations.

The majority of the innovations were developed by the company itself. Still, larger companies differ from the smaller by more frequently cooperating with other companies and institutions when making innovations.

The majority of cooperation partners were clients and consumers (19%), sup-

Innovation-related cooperation is very rare.

Figure 3. *Who developed the innovations in 2002-2004 by type of innovation*

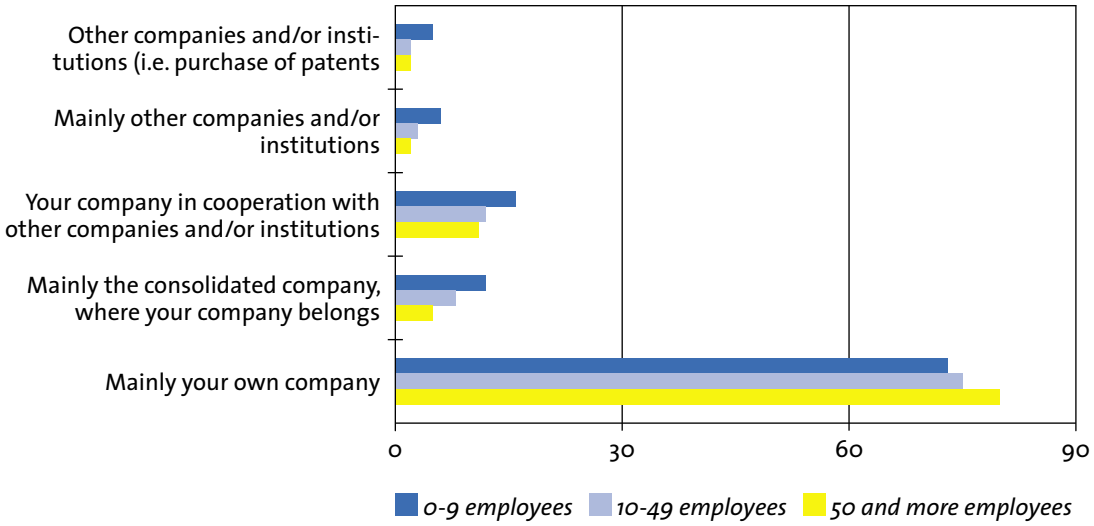
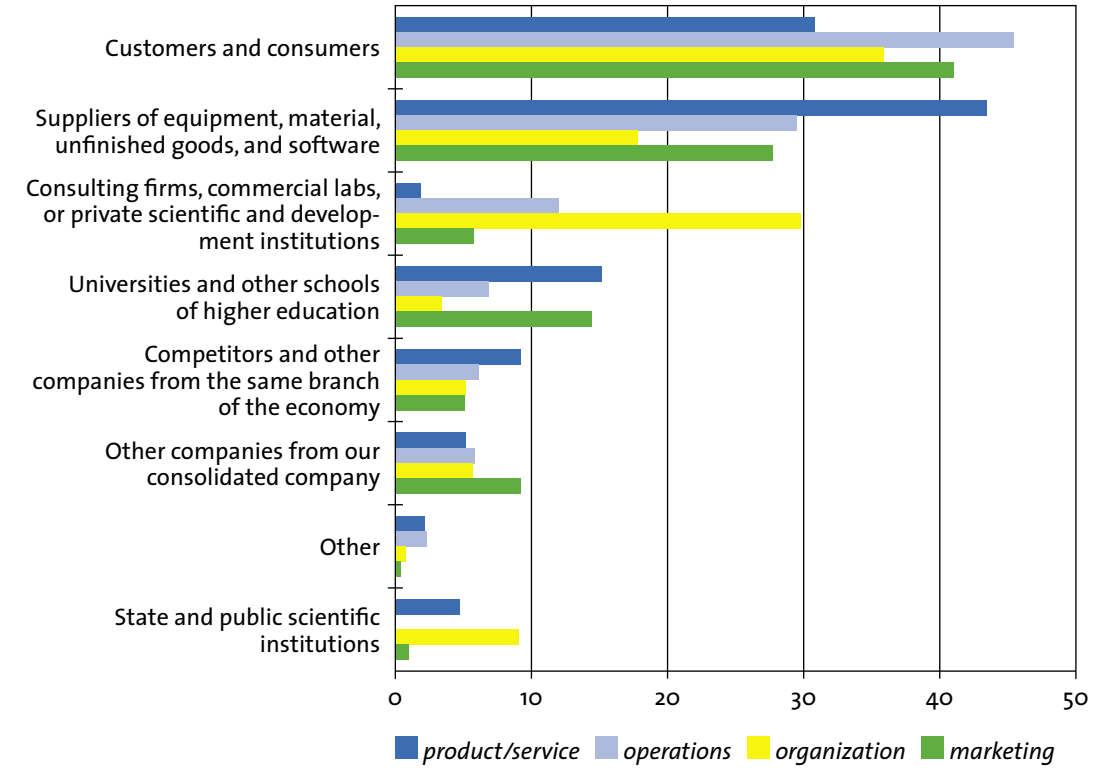


Figure 4. *Cooperation partners involved in the development of innovations in manufacturing enterprises, by type of innovation*



6 – Silja Kurik, Rünno Lumiste, Erik Terk, Aavo Heinlo. *Innovation in Estonian Enterprises 1998-2000*. Tallinn, 2002.

The main source of financing for innovations was self-financing.

pliers of equipment, semi-finished goods and software (20%). The fact that consumers and suppliers are considerably more important than scientific institutions, confirms once more that in some fields of activity (i.e. agriculture, textiles, services) – Keith Pavitt has called these supply-side fields of activity[7] – the majority of innovations in Estonia, as well as elsewhere, are made by suppliers of equipment and materials, the participation of the technology users in R&D is generally modest and the number of patent applications is small. In the sectors with effects of scale (i.e. the steel industry, mechanical engineering), R&D takes place primarily in larger enterprises, where vertical integration and the introduction of new technologies is closely related to the development of internal skills. In research-based industries (i.e. electronics, biotechnology), the primary source of technological innovation is R&D conducted in the company itself, as well as in scientific institutions.

The main source of financing for innovations was self-financing, which was followed by support from the financial sector or loans from family, friends, and acquaintances. At the same time, it was evident that the more high tech the company, the greater the likelihood that the project was self-financed. In turn, this could mean that market failure exists in the financing sector, as well as the fact that companies have sufficient self-financing for innovative projects. At the same time, not all innovations presume (significant) investments.

1.2. Main problems from the entrepreneurs' point of view

Inter-company co-operation is viewed as being too risky.

Taking into account the small size of Estonian businesses and the relative constraints of the Estonian market, in long-term inter-company cooperation is essential. Unfortunately, inter-company cooperation is currently very limited and, when analyzing the factors inhibiting cooperation, the situation is distressing. Cooperating is viewed

Figure 5. *The financing sources used for the introduction of innovations, by type of innovation*

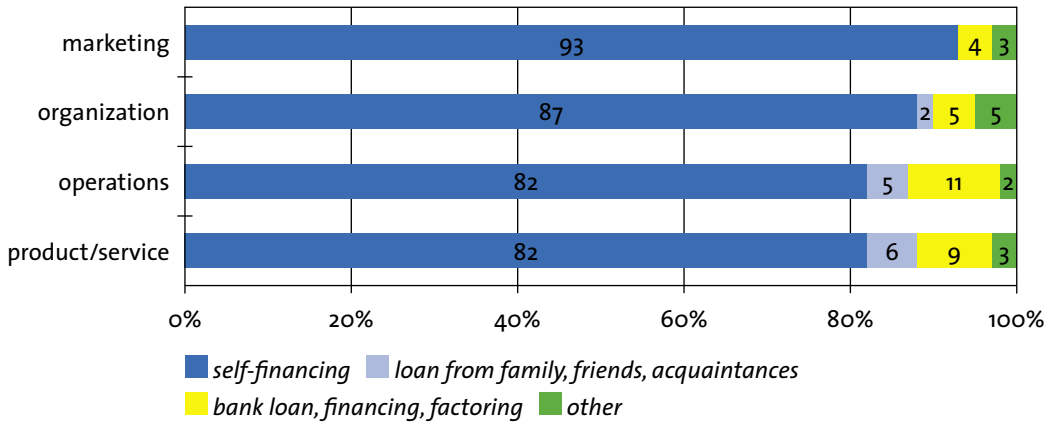
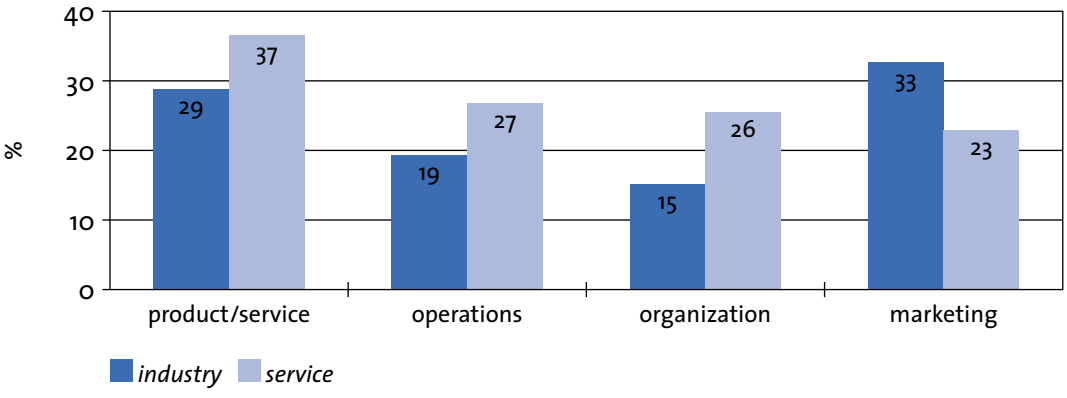


Figure 6. *Cooperation experiences of companies introducing innovations in 2002-2004*



7 – Also see Keith Pavitt, Sectoral Patterns of Technical Change: Towards a Taxonomy and a Theory, *Research Policy*, vol. 13, 343-73, 1984.

Figure 7. *The greatest obstacles to inter-company cooperation in the opinion of manufacturers with cooperation experience*

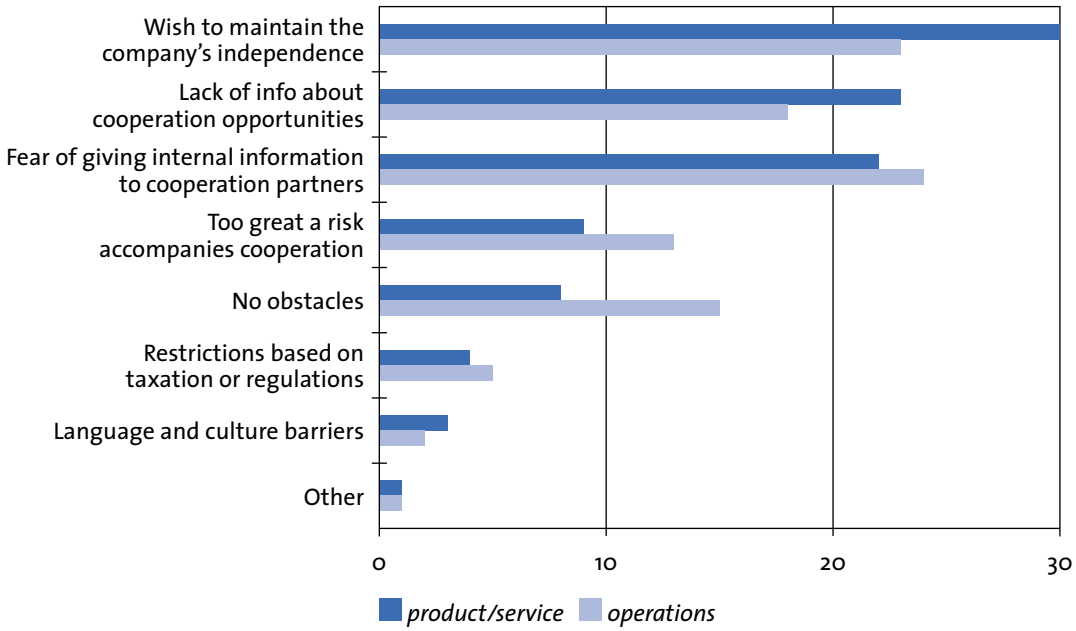
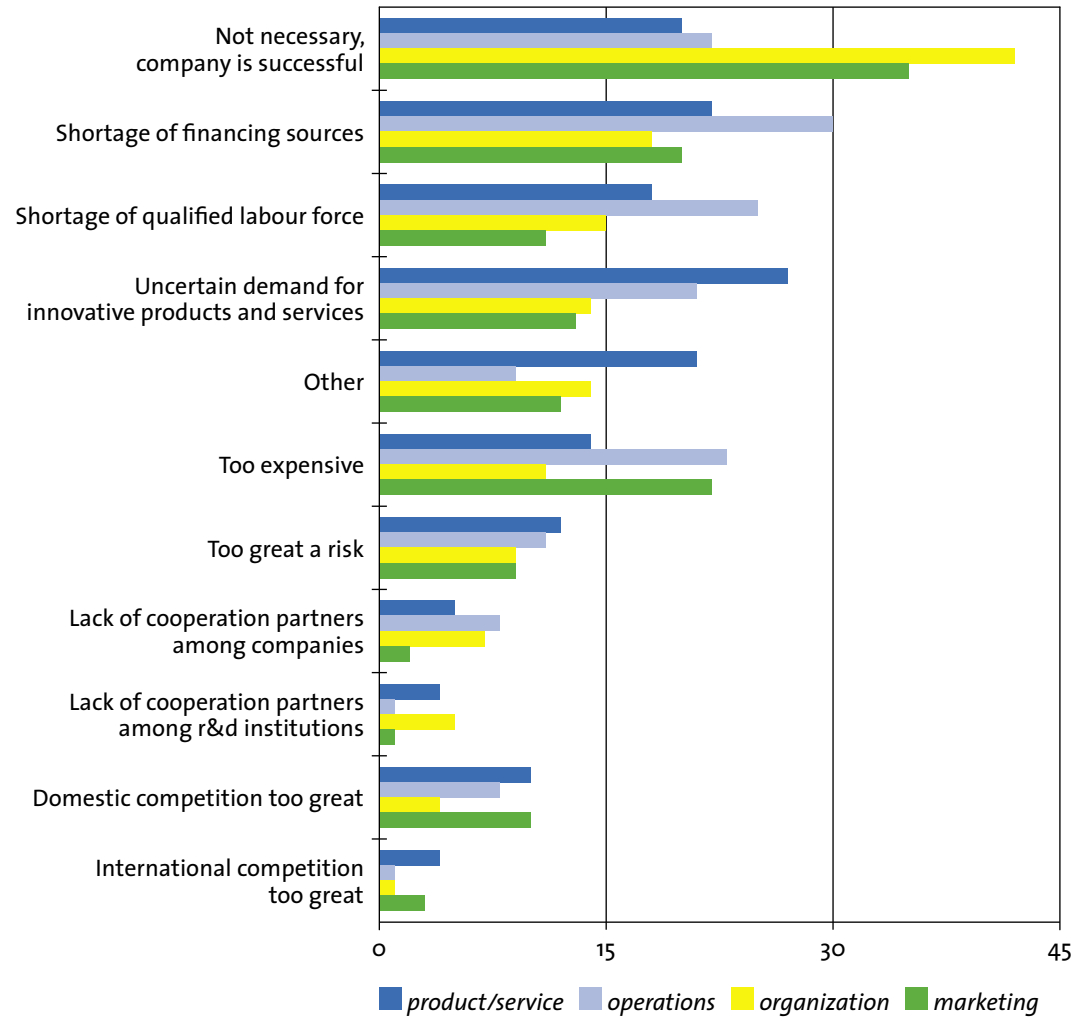


Figure 8. *Factors inhibiting the introduction of innovations*



Greatest development obstacles are shortage of financing and qualified labour.

as being too risky (information and independence) and cooperation is significant only in the high technology sector.

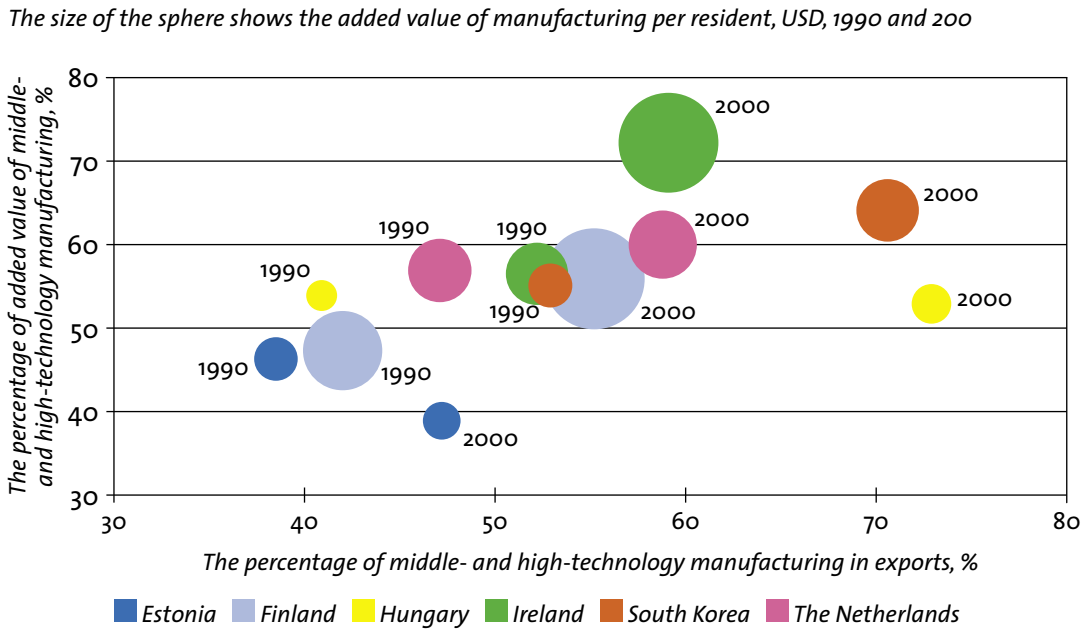
For those who discontinued innovations, as well as for those who did not introduce innovations, the reasons were **shortage of financing sources, which was followed by the shortage of qualified labour, and uncertain demand for innovative goods and services**. Therefore, the companies questioned did not fear the costs and risks related to innovation; their achievement is inhibited by the shortage of financial instruments and well-prepared and experienced people.

30% of respondents rated their companies as successful and thereby did not see any necessity for innovations.

30% of the companies, who have not worked out innovations, rated their companies as successful, and thereby did not see any necessity for innovations. This was often presented as an argument to justify the lack of marketing and organizational innovations. Among other reasons, the lack of time was mentioned very often, although some also admitted to a lack of ideas and management skills.

Hence, for the companies that participated in this survey, the primary development obstacle was the financing of innovations, finding sufficient labour, as well as an insufficient market for the innovations. In other words, one can say that the companies lack the main resources that would guarantee growth through innovation – the existence of skills and markets – which would also allow for a reduction in the risk of financing innovations. Most probably, these problems have been characteristic of Estonia industry and economic development for the last 10 years, as observation of the changes in the structure of manufacturing confirms. One can examine changes in the structure of manufacturing according to the volume of knowledge and skills, and here, in turn, two widely utilized yardsticks can be used: the change in relative importance of middle- and high-technology industries in export and value added.[8]

Figure 9. *The volume of technology and added value in industry and exports per resident in a selection of countries*[9]



8 – UNIDO has already used this method for years, see *Industrial Development Report 2004. Industrialization, Environment and the Millennium Development Goals in Sub-Saharan Africa. The new frontier in the fight against poverty*, United Nations Industrial Development Organization (UNIDO), 2004, http://www.unido.org/; *Industrial Development Report 2002/2003. Competing through Innovation and Learning*, UNIDO, 2003, http://www.unido.org/. Countries were chosen based on size and stage of development. Estonian export information is from 1996-2000.

9 – Source: *Industrial Development Report 2004. Industrialization, Environment and the Millennium Development Goals in Sub-Saharan Africa. The new frontier in the fight against poverty*, United Nations Industrial Development Organization (UNIDO), 2004, http://www.unido.org/; authors' calculation.

As the third dimension, the added value of manufacturing per resident was examined, which shows the effect of changes in the economic structure on the actual well-being of the population.

From 1990-2000, two transitional countries – Estonia and Hungary – have experienced weaker development as compared to other comparable countries.

Hungary has been able to notably increase middle- and high-technology manufacturing exports, but this has not had a great substantive influence on the domestic manufacturing structure, which, in turn, is reflected in the fact that the value added per resident has not substantially increased during the last 10 years. A similar trend can be observed in Estonia, where, starting in 1996, the middle- and high-technology manufacturing exports have increased, but at the same time, the relative importance of middle- and high-technology in added value has decreased. This is also reflected in the fact that the added value produced per resident in Estonia was greater in 1990 than in 2000.[10]

At the beginning of the 1990s, Finland was structurally in a position comparable to Estonia, although considerably wealthier, but by 2000, Finland had significantly improved its economic structure and thereby substantially increased its wealth. In the 1990s, Ireland, the Netherlands, and South Korea were in relatively similar positions, although South Korea had significantly less value added per resident. Ireland's development has been very impressive and expressed in a noteworthy increase in wealth.

Therefore, one can state that the development of Estonian industry has been characterized by the constant decrease of the relative importance of middle- and high-technology in value added, and this is apparently caused by the primarily subcontracting nature of Estonian industrial enterprises. This situation, in turn, explains why Estonian companies have difficulties finding markets.

Therefore, Estonian industry becomes even less integrated, whereby cooperation and the need for it are also reducing. At the same time, the educational system and companies have not found a satisfactory solution for modernizing the workforce and the R&D and innovation systems are directed primarily at the commercialization of knowledge existing in the universities. This is clearly too complex from the viewpoint of Estonia industry. All these problems, in turn, make innovations related risk management very complicated.

The development of Estonian industry has been characterized by the constant decrease of the importance of the middle- and high-technology in the value added.

1.3. The use of public sector support

Compared to other European Union member states, Estonian business receives significantly less support.

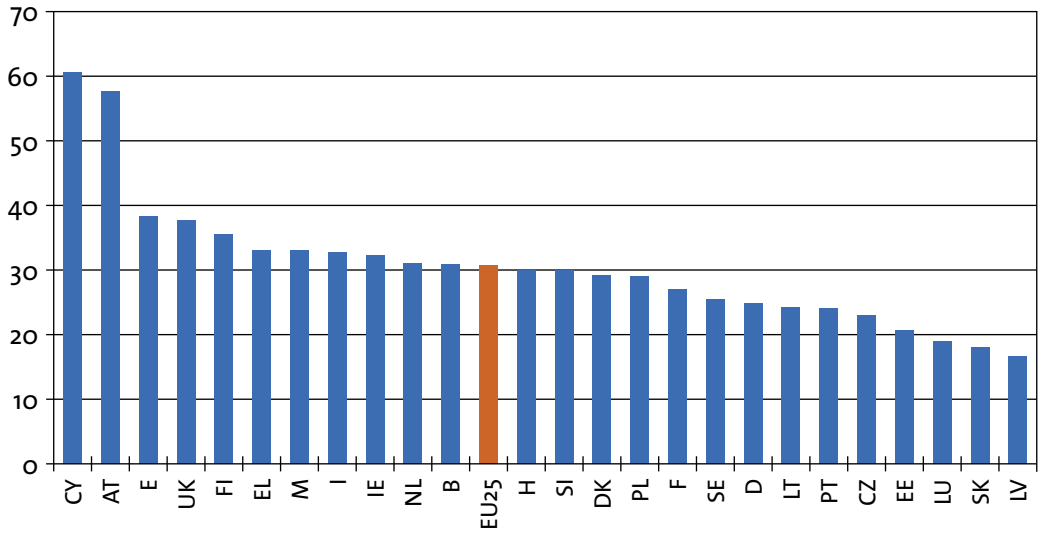
The results of this study also show that the percentage of those who applied for or received supports was low in the target group of companies, respectively 13% and 8%.

Supports were primarily applied for and received for so-called soft and small-scale measures (training, consulting, export planning). Taking into account the profile of the study target group, which included a higher than average number of industrial enterprises, and those with high turnovers, which are capable of applying for larger supports (infrastructure supports, R&D supports) and left out many smaller service enterprises and the agricultural sector, which more often use small-scale consulting, training and agricultural supports, it is clear that large-scale investment supports affect only a very small group of companies.

The main problems that companies have mentioned in connection with applying for business supports are the administrative obstacles related to the application process - continually changing rules (29%), complexity of the application process (51%) and project administration (11%), which, in combination with the poor competency of the public sec-

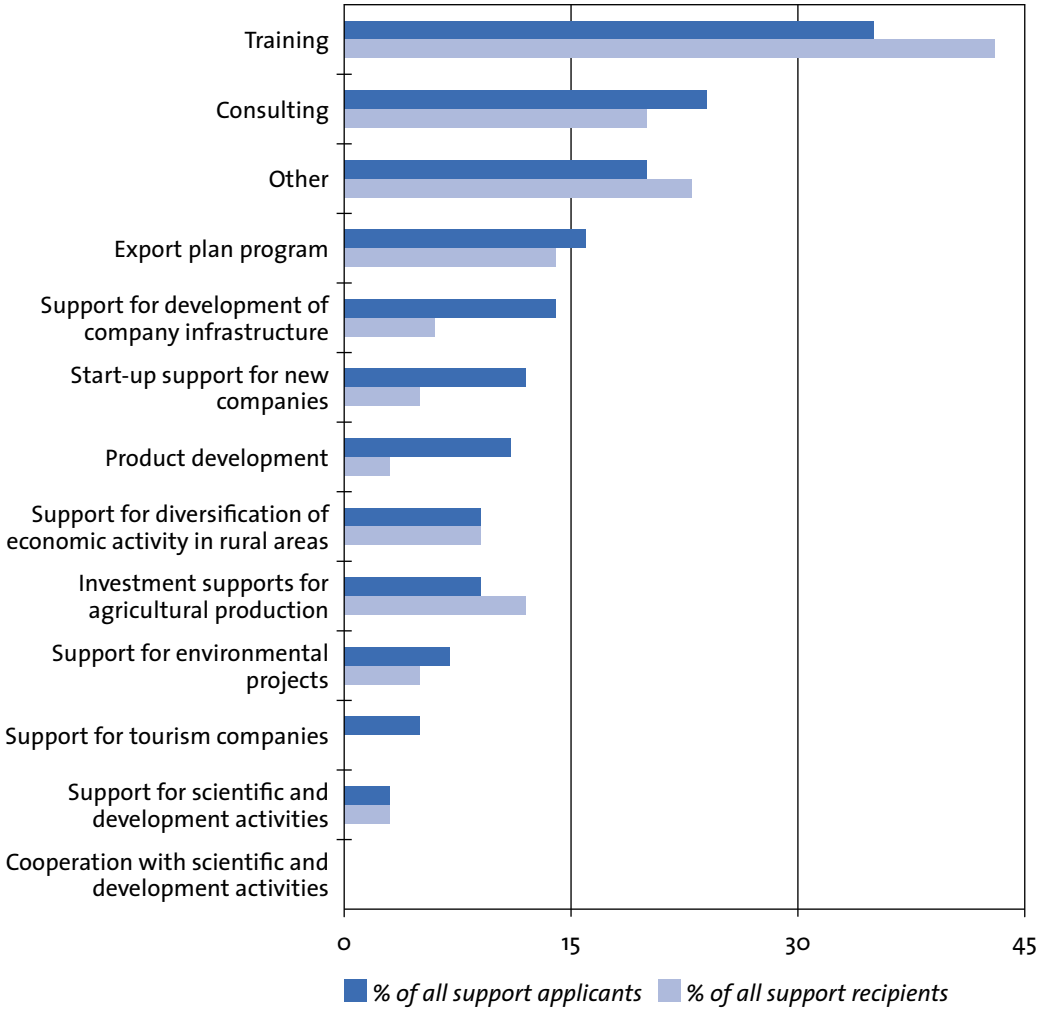
10 – Marek Tiits, Rainer Kattel, Tarmo Kalvet, Rein Kaarli. *The Estonian Economy. Competitiveness and Future Outlooks*. Tallinn, Secretariat of the Reserach and Development Council, 2003, http://www.riigikantselei.ee/?id=5316

Figure 10. *Share of companies using public sector supports among innovative small- and mid-sized companies (20-499 employees), 2002-2003*



Source: Anthony Arundel, 2004 Trend Chart Statistical Papers Series, 2004, p. 9.

Figure 11. *Use of public sector supports, by type of support*



tor to provide advice (17%), forms the greatest set of problems. Another set of problems is related to financing – both the lack of self-financing (28%) and the small scale of the support (28%). The other problems that were mentioned include the slowness of the process, whereby it is difficult, if not impossible, to plan operations and also the very narrow limits of the supported activities.

Among those who have not applied for supports, the main reason was a lack of knowledge about the various support programs. Middle- and high-technology companies, more often than the other, mentioned the lack of suitable support programs.

Of the companies that applied for supports, but did not receive them, 31% completed the projects (11% at a reduced scale), and 23% abandoned the introduction of innovations. Many were still waiting for answers to their applications, were preparing new project applications, or had postponed the implementation of the projects.

1.4. The main solutions from the entrepreneurs' point of view

Lack of knowledge of the various support measures is still common.

Following is a analyses of the solutions offered by the companies themselves for resolving the problems. If we compare the most popular solutions offered by the companies, we notice the popularity of practice training systems.

In figure 14, we see the general preferences together with the companies' concrete wishes to apply for the respective supports in the near future. It turns out that in the case of support for practice training, as well as for many other support programs, the general assessment of a necessity for the measures exceeds the desire to use them. The opposite trend is true of training and new equipment acquisition – even if supports are not considered to be that necessary, one is ready to apply for them.

Introduction of efficiently working practice training systems is anticipated.

In the case of some measures, the less-than-excepted interest was surprising. Therefore it is important to look into details – if and what kind of businesses find these instruments to be of importance:

Figure 12. *Reasons for not using public sector supports*

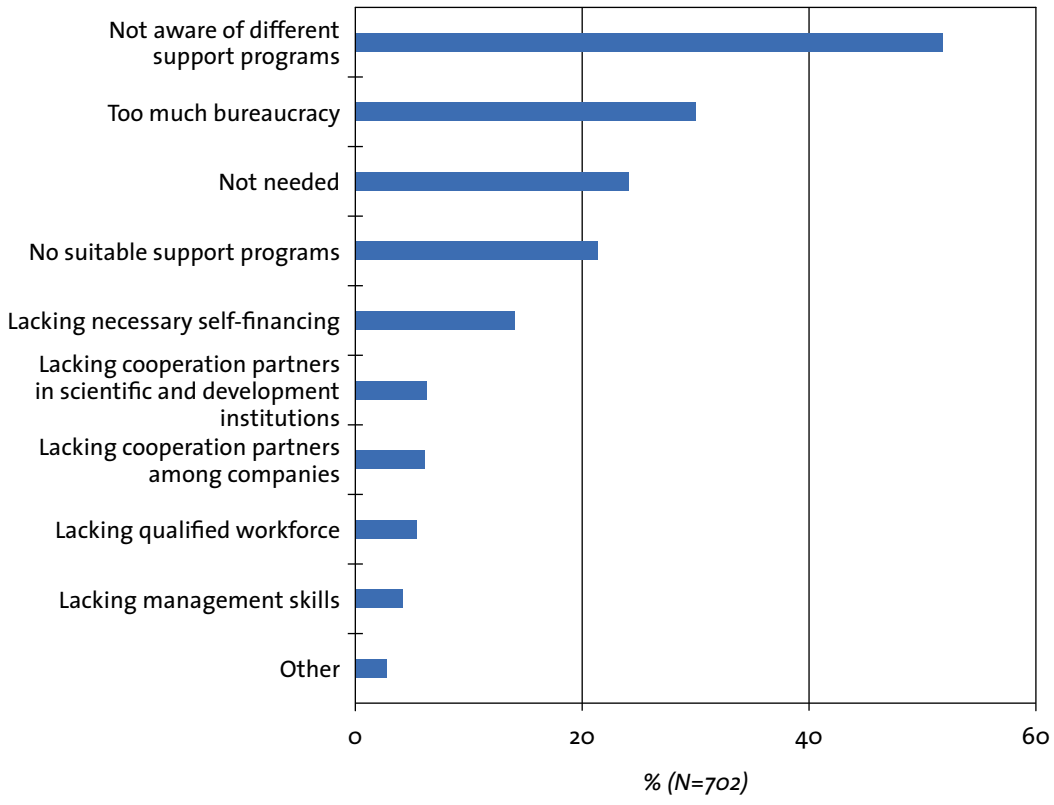


Figure 13. *Most popular support measures*

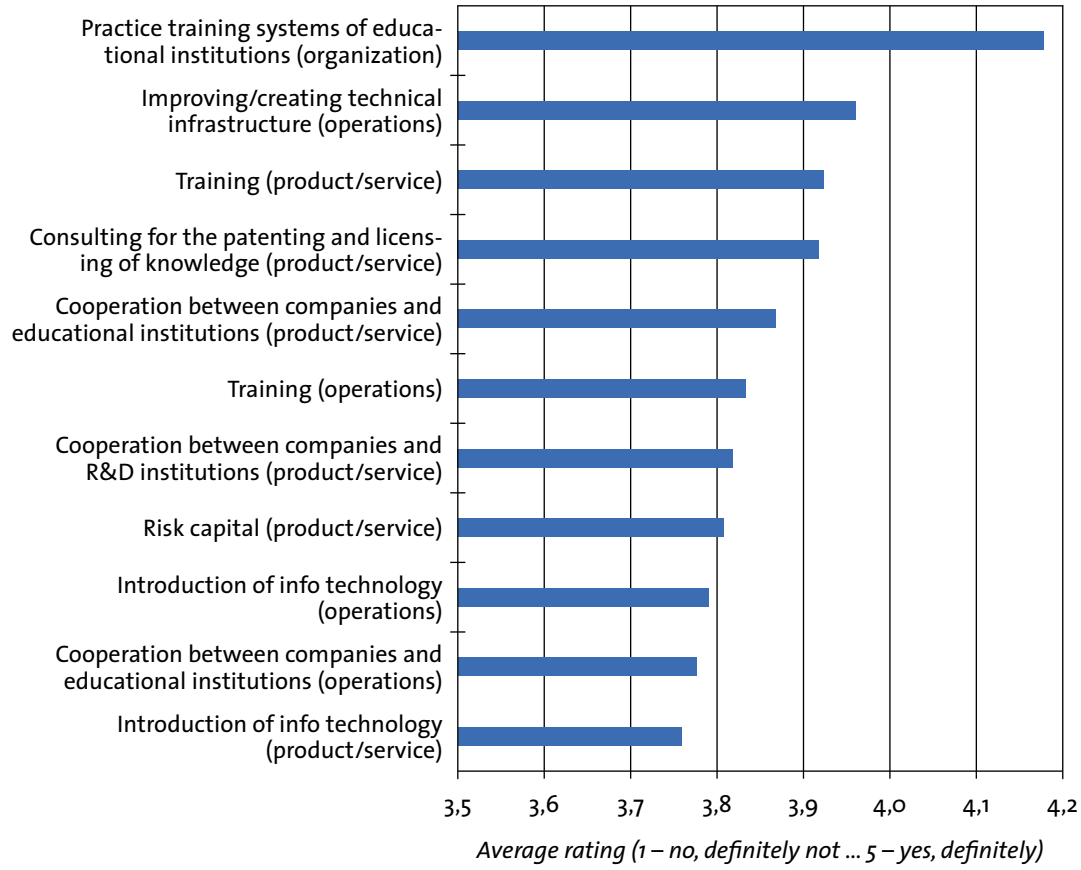
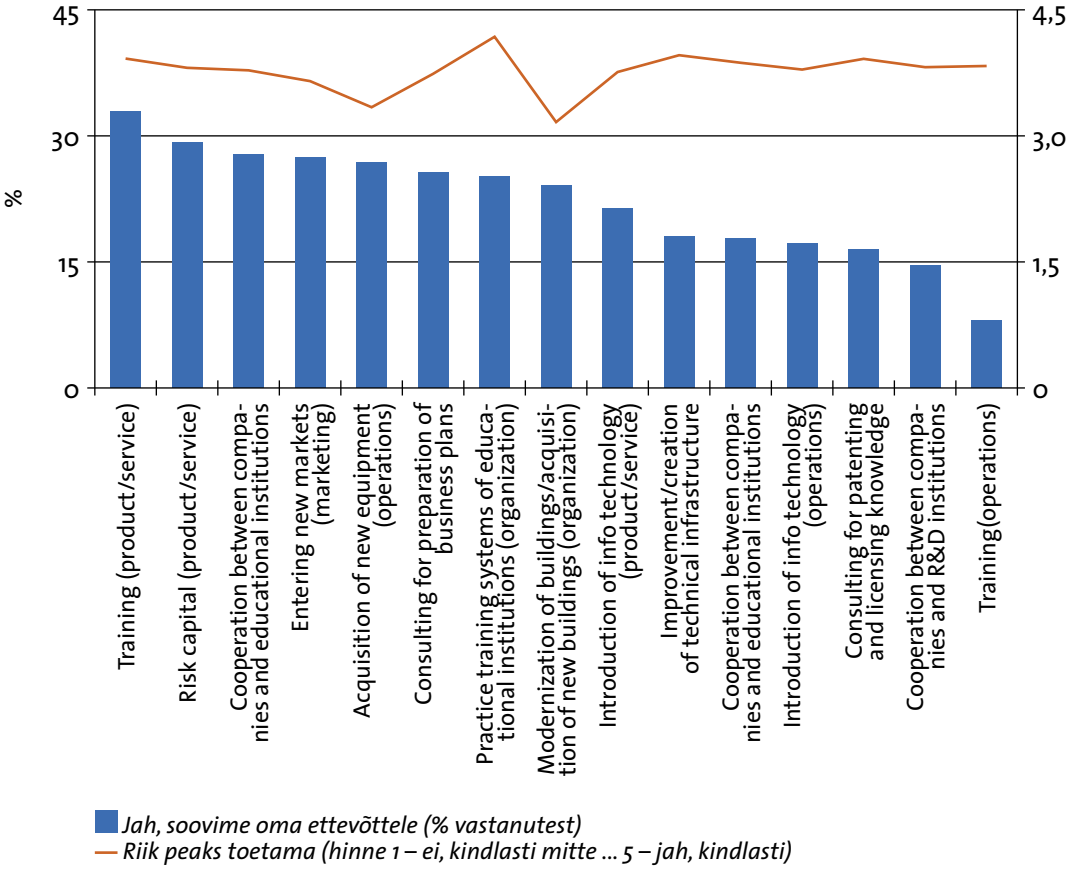


Figure 14. *Highest-rated and desired support measures*



- In case of the support for **equipment acquisition** it is important to distinguish between industrial enterprises and the ones that provide services, as the latter are clearly not the target group for this measure. If the average for companies interested in applying for this measure is 24%, then the percentage among manufacturers is 39%. Therefore, leaving out service companies, this measure would easily rose to the top of the list of measures that companies desired for themselves (see figure 14).
- Generally unpopular idea of state support for **hiring and training product development engineers** was more popular among larger companies and the companies that introduced innovations.
- Support for **hiring and training designers** was more demanded by middle- and high-technology companies that have not introduced any innovations in the last few years. However, it is clear that interest in this measure is relatively modest.
- Support for **entry into new markets** is slightly less interesting for resource-based companies that for the others. Enterprises from Tallinn and Harjumaa as well as innovative enterprises would apply more actively for the support.

In conclusion it should be noted that the problems that entrepreneurs see as hindering innovation, and thereby growth (financing, qualified workforce, lack of markets), can only be solved to a small degree by those solutions that the entrepreneurs themselves desire. A large number of these solutions are actually one-time ancillary activities, such as training or supports for entering new markets and consultations. These solutions, however, will not eliminate the systematic problems facing entrepreneurs. An exception is the reform of the practice training system and cooperation with educational institutions, which has found great support among entrepreneurs (and which are essentially very closely related), and the development of technical infrastructure, all of which are by nature very long-term and systematic solutions. At the same time, these solutions are also not sufficient; it is necessary to create a set of solutions, which would solve the systematic and structural problems of Estonian industry:

- a reduction in the knowledge intensiveness (reduction in complexity),
- a shortage of qualified labour
- a lack of markets
- a shortage of financing.

Manufacturers desire financial support for equipment acquisition.

2. Recommendations for business support measures in 2007-2013

2.1. Development, development policies, and business support measures

The development of the Estonian economy during the last decade has roughly followed the pattern of development in countries with the same standard of living, which is characterized by two trends that, at first glance, seem to be contradictory: relatively high economic growth figures (both GNP and export growth) accompanied by very unbalanced domestic growth and development (social, regional and generational imbalance). Generally, these have been justified both politically and theoretically as the so-called price of a transition period, which must be paid if the society as a whole is to rapidly change and grow. This is not a view that has spread during the last decade: we also find such opinions in debates from 50 years ago.[11] Therefore, the question is primarily not whether the economic development of a developing country is unbalanced, but rather how and with what to balance it. The question is how much and what kind of value the developing and rapidly growing economy has created to balance the imbalanced domestic development.

Most of the solutions proposed by entrepreneurs are one-time activities.

The value created by the economy is expressed primarily in an increase in productivity and real wages, which, in turn, are dependent on the technology employed in economic activities and the volume and complexity of skills. The changes that

Long-term and complex solutions are needed.

11 – See, for instance, Albert O. Hirschmann, *The Strategy of Economic Development*, New Haven: Yale University Press, 1958.

Subcontracting does not favour the creation of positive feedback mechanisms.

have taken place in Estonia – as mentioned above – have been relatively typical of developing countries: in the course of fast export- and consumption-based growth, the volume of technology and skills in the economy have decreased. In other words, Estonia's economic growth to date has not been able to create sufficient value to balance uneven growth (the current account deficit is testimony to this Therefore, the very high export- and consumption-based economic growth to date may continue for the next 5-10 years without a reduction in the unbalanced domestic development; the more so, since a large number of economic processes are cumulative by nature.

A free market economy or free trade alone can definitely not be accused of being the cause of these problems. Today, many developing countries face similar problems[12] and there are two important reasons for this: 1) many sectors with high exports in developing countries – like Estonia – are of a subcontracting nature; but this means that these companies, and the sector as a whole, often has almost no contacts with other companies, educational and R&D institutions, or economic sectors, whereby all positive feedback mechanisms (i.e. substantive cooperation between companies) are essentially missing, which, are however the basis for the growth of volume in technology or skills (technology transfer, constant innovation, additional training, etc.);[13] 2) the globalized economy that often makes price competition global and allows large companies to keep continuously developing through subcontracting and finding advantages in price competition – whereby value changes (or clusters) are become ever more global and ever less geographically and politically defined (which, in turn, makes developing business by purely domestic political means more complicated); at the same time, this also means the ever greater disengagement of R&D activities from a concrete geographically and political space. In developing countries this means that the high-technology and high-quality R&D taking place in their country may not contextually have any influence on the character of the economic development in their country (on the growth of the volume of technology and skills and reduction of imbalance), since the revenue received is transferred to the global enterprise.

High-quality R&D may not have any positive influence on the economic development.

In summary, the aforementioned means that, despite excellent figures for economic and export growth, and why not also excellent scientific development – here, for instance, we can mention Estonia biotechnology – the growth of productivity and real wages of the entire economy and society remains weak, and therefore, a reduction in unbalanced development is not achieved.

Introduction of innovations that are not related to subcontracting activities are limited in Estonia.

In business, these problems are not only expressed by limited R&D activities, but primarily by limited product and operational development that is not related to subcontracting activities (the complexity of entering new markets and finding means of financing, highlighted by the entrepreneurs in this survey, is an expression of this). Therefore, entrepreneurs do not have specific experiences with the development of new independent products or cooperation in this field, and it is also complicated for them to find financing, since both guarantee capital, and knowledge (as capital to reduce future risks) is lacking, and primarily to find the respective highly educated human capital, since this is connected with very large risks for the average Estonian manufacturer. The existing state R&D system and innovation policies have

12 – See also Shafaeddin, S.M, *Trade Liberalization and Economic Reform in Developing Countries: Structural Change or De-industrialization?* http://www.networkideas.org/featart/aug2005/De_Industrialization.pdf, 2005.

13 – The development of IBM in Hungary can be brought as a good example: if a few years ago, IBM moved its computer production from Hungary to Asia, then today IBM is moving its software maintenance from Germany to Hungary. Even if, in the case of Hungary, IBM essentially uses the same production facilities (that belonged to the former large enterprise, Videoton), which were empty in the intervening years, the new people will be hired and contacts with other software companies, or higher education institutions is this field are practically non-existent. A similar example can be brought from Latin America of the so-called maquila industries in Mexico (companies that only produce for export to specific areas; primarily car manufacturers), where in decades, practically no contacts have been established with domestic companies.

essentially nothing to do with the average Estonian producer. The existing educational system does not produce workers, but people who business must retrain for its purposes (this in the sense of practical skills and technical foundation).

In order to obtain an overview of the structural resource measures in use today, it is sensible to examine them against the background of the development policies by prosperous countries described in the introduction. The elements of successful development policies are:

- The market (for instance, export supports, market protection tariffs, intellectual property and its protection, different standards, etc.);
- Finances (for instance tax benefits, loans and securities, subsidies, etc.);
- Technology and R&D (for instance, the support of technology transfer; support of R&D, etc.);
- Workforce; education (for instance active labour market measures, doctoral schools, etc.).

On the basis of the classification (Table 1) of the measures in the Single Programming Document (SPD) for 2004-2006, one can conclude that there are few measures that support the enlargement and financing of companies' markets (i.e. the growth of productivity). In addition, the supports in these two fields are non-recurrent in nature. Also noteworthy is the concentration of technology and R&D support around high technology. During the course of this survey, the companies brought out these same fields as the main problems. It is important to note that, in the opinion of the authors, many of the solutions proposed by the entrepreneurs in chapter 1.4 do not provide long-term solutions to the companies' innovation barriers. The solutions proposed by the companies that are described in that chapter are mostly non-recurrent in nature and do not solve the most fundamental problems (financing, qualified labour force, technical infrastructure) that the entrepreneurs themselves have defined and especially not those obstructions that pose the greatest problems (Chapter 1.2).

Few measures support enlargement of markets as well as financing.

In order to find a solution for this situation, it is necessary to create mechanisms that increase productivity and this in sectors and fields of activity which 1) have a possibility for cooperation between companies and the development of synergy

Technology and R&D support concentrates around high technology.

Table 1. *Classification of measures in the National Development Plan (RAK) for 2004-2006*

Market	• Export plan program • Development of transport infrastructure • Development of information society
Finances	• Start-up support for new companies • Guarantees
Technology and R&D	• Support of business infrastructure development • Business incubation program • Spinno program • Technology development centre (TAK) program • Development program for the development of scientific and development infrastructure • The support of scientific and development projects
Workforce	• Educational system available to everyone that guarantees the flexibility of the workforce, subsistence, and life-long study • Equal opportunities in the labour market
Education	• Training support • Consulting support • Innovation awareness program • Educational system available to everyone that guarantees the flexibility of the workforce, subsistence, and life-long study • Modernization of vocational and higher education and the supporting infrastructure

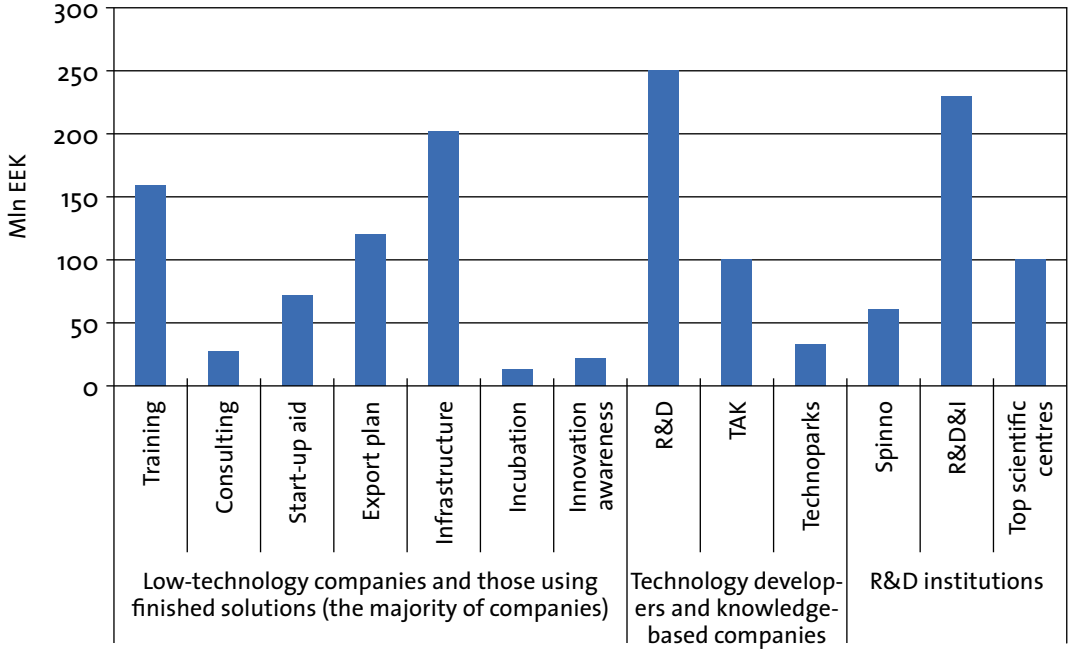
Industrial policy enables manufacturers and knowledge-based service enterprises move into activities and fields that allow rapid growth and inter-company cooperation.

between companies, 2) have great growth potential, and 3) have a sufficient number of operating companies and even rudimentary knowledge and skills. Estonia must essentially create an industrial policy that has been lacking to date, otherwise, even with high figures for economic and export growth, a solution will not be found for very unbalanced domestic development, and consequently, a large part of today's policies supporting innovation and R&D activities will also fail.

The objective of industrial policy is to enable industrial and knowledge-based service enterprises to move into activities and fields that allow for rapid increases in productivity (and thereby also real wages) and for inter-company cooperation (positive feedback mechanisms will develop). In the 2007-2013 financing period, the structural resources directed at business development must be used to work out just such a policy. Based on the aforementioned, the following fields must be dealt with by measures to support Estonian business in 2007-2013

- **The input of entrepreneurs to the policy-making process** must significantly and quickly increase, since all the remaining solutions depend on how well or poorly Estonia can create regular and well-functioning feedback mechanisms between business and politics, the other side of the coin is a significant increase in the competency of the public sector;
- Today's **practice training system in vocational, applied and higher education schools** must be radically changed and this change must include active measures for the development of the labour market;
- **Technology transfer** or the import and improvement of technology (equipment) in combination with the development of the respective skills (people) must be one of the primary mechanisms for supporting business;
- **In key fields, technology programs**, which are missing to date, must be created simultaneously with technology and skills transfer and be connected the possible development of existing companies;
- Essentially, **cooperation between entrepreneurs and between entrepreneurs and educational institutions** must be the **horizontal conditions** (i.e. precondition for receiving support) covering all the measures.

Figure 15. *The measures provided to companies and R&D institutions with the support of European Union funds in 2004-2006*



Source: Ministry of Economic Affairs and Communications

2.2. The contribution of entrepreneurs to the policy-making process

Many entrepreneurs (54%) believe that the state should improve entrepreneurs' opportunities to provide feedback on the development of policies and measures. Indeed, the development and coordination of public sector policies is at a poor level.[14] In the fields of business, R&D, and innovation, regular evaluation and coordination of policies is lacking, which results in a lack of a substantive overview of the influences, weaknesses, and strengths of current policies. At the administrative level, the problem is the lack of an intermediate level, which would unite the activities of general strategy (i.e. *Estonian Success 2014, Knowledge-based Estonia*) with specific departments and divisions.

In addition, an effective and rapid system for collecting feedback from entrepreneurs would guarantee that public sector policies would better reflect actual economic problems. Moreover, feedback should be collected from organizations uniting entrepreneurs, as well as the 80% of companies that are not members.[15] Better direct feedback from entrepreneurs would also allow for more specific measures for business support and innovation policies to be worked out, which, in comparison to the current ones, would have a considerably higher use factor (studies conducted among entrepreneurs partially fulfil this purpose, but generally studies do not reveal more specific problems).

Therefore, a clear need exists to comprehensively review the strategic problems that have been mentioned and to determine solutions that would create 1) specific and 2) long-term and enduring mechanisms. A mechanism is needed that would reflect agreements in two areas: 1) how to deal with specific actual problems within the framework of development policies and 2) what is the mechanism for the development, evaluation, and coordination of considerably improved development policies.

One such mechanism could be the **consistent monitoring of the economic sector**. Essentially, this would mean working groups formed in fields of activity from the private sector and R&D institutions that would operate in 5-6 sectors (in essence, the entire Estonian economy would be divided into these sectors according to technological connection; these could also be called clusters), and which, for instance, would compile a biennial overview that focused on the problems related to technology and skills in the respective sector. If possible, this monitoring should involve, in addition to Estonian entrepreneurs, the foreign owners of companies operating here and should be mandatory in the development and evaluation of policies in the respective ministries. At the same time, this monitoring would make substantial use of future monitoring resources. From this, all other strategies and activities – such as the new state development plan for the use of European Union Structural Funds to come into force in 2007 – could obtain actual input, for instance, about the need to make changes in the curricula, vocational school practice training, financing of R&D projects, etc. These commissions could be administered by the Scientific and Development Council (TAN), which would create substantive supplemental functions for the latter. For instance, these working groups could work closely with the working groups dealing with the development of different European Union R&D financing programs (i.e. 7th Framework Programs). Thereby, a link could be created between European Union R&D financing and Estonia's actual economic needs.

Direct feedback from entrepreneurs would allow working with more specific issues.

The consistent monitoring of the economic sectors would be a valuable input into strategic documents.

2.3. Reform of the current practice training system of vocational, applied and higher education schools

If we compare the measures, where the involvement of the state is most anticipated, then a large number of entrepreneurs have specified the weakness of the practice training system and the need to develop respective measures (Chapter 1.4).

Practice training system should manage the risks for both the student and the entrepreneur.

14 – Rainer Kattel and Tarmo Kalvet, *Knowledge-based Economy and ICT-related Higher Education: Overview of Current Situation and Challenges for the Educational System until 2008*, Eesti Infotehnoloogia Sihtasutus ja PRAXIS, to be published in 2005.

15 – Eesti väikese ja keskmise suurusega ettevõtete arengusuundumused. EMOR, 2003.

Although a large number of students go to work early, practically no one can immediately hire a person with the necessary skills. Students apparently work at very simple jobs. At the same time, entrepreneurs are lacking any substantial interest or need to hire someone for a few weeks and to train him/her, because this would mean finding simple work for the trainee and wasting the time of supervisors. Today, the practice training system is essentially an additional risk for employers and does not give the student very much. Here too a system must be created in order to manage the risks for the student and the entrepreneur. The new practice training system should be based on the following principles:[16]

Support to equipment acquisition would provide an important impulse for the modernization of the manufacturing.

- In vocational education, practice training should form nearly 50% of studies, in higher education nearly 25% (including graduate studies).
- The entire practice training system must be covered by a system of standards and payment levels, which the student must complete.
- During the practice training, wages are paid by the state as a stipend, and the same amount is paid to all the students at the same level. This places the employers and the students into equal positions.
- After the practice training, the student is obligated to work for the company for two years, if the company so wishes. This does not apply in the case of further studies.
- During these two years, part of the student's salary will go to the state stipend fund and the company will have the possibility, for instance, of relinquishing the student's services for 6 months every year. In the latter case, the student will again receive a state stipend with the requirement to attend supplemental training.

The aforementioned system should:
- To a substantial degree, bring together the educational system and enterprises,
- To a substantial degree, motive employers to use trainees,
- To ensure acquisition of up-to-date skills for the students that are necessary on the job market and the constant updating of skills for at least two years after the acquisition of their education,
- To guarantee work for the students for at least two years after graduation,
- The management system must insure the representation of the interests of all parties in the development of standards, etc.,
- Also, reduce the need for the state to interfere and guarantee a substantially higher quality of interference, since input should be stronger.

This system would also substantially solve the problem of the shortage of practical training and group work in higher and vocational education in Estonia today. This is a relatively inexpensive and sustainable system for the state, and in essence, such a system transfers some of the material foundation costs to companies, who through the practice training system allow the universities to use their infrastructure. A similar system is in use, for instance, in the industries in Singapore and South Korea. The so-called apprentice systems of Germany and other countries in continental Europe, the implementation of which has been very successful in Ireland in the 1990s, are by nature very similar systems.

Practice training system should be sector-based and their management programs should be based on the monitoring described above.

2.4. Transfer of technology and skills

Estonian public sector measures must enable companies to acquire and develop technical infrastructure and worker skills to a much greater extent than they have to date. This is also made possible by current measures, but in addition to supporting R&D projects and the development of road, electricity and water networks, substantially more support should be given to equipment acquisition. This

16 – Rainer Kattel and Tarmo Kalvet, *Knowledge-based Economy and ICT-related Higher Education: Overview of Current Situation and Challenges for the Educational System until 2008*, Estonian Information Technology Foundation and PRAXIS, to be published in 2005.

would provide an important impulse for the modernization of manufacturing. The assessment of the authors is that the financial importance of these measure should increase manifold, and at the same time, the financing principles should also be changed (the most important is the promotion of cooperation).

A substantially greater portion of financial resources should also be directed to the transfer and modernization of skills. Making it possible for companies to hire (both foreign and local) engineers, designers, and others should be emphasized. This could, for instance, be organized by partially covering the costs of the respective employee's salary for 2-3 years (practically all the new member countries, except Estonia, use ESF resources to subsidy salaries). The provision of training support should also be more focused than today, and partially connected to the observance of quality management and other respective standards.

The principles for financing the transfer of technology and skills, as well as innovation, should substantially differ from the competition-based contests between projects in force today. Instead, cooperation between companies, and also between companies and educational institutions, should be encouraged (for instance, participation in the aforementioned practice training system), adding the respective conditions and evaluation criteria to the support measures.

Examples of measures that promote the development of cooperation networks between companies and companies and educational institutions, can be brought from both old and new European Union member countries.[17]

Taking into account the fact that, as was revealed by the study, inter-company cooperation is unfamiliar to many Estonian companies, the benefits and possibilities of cooperation should also be explained.

2.5. Technology programs for key fields of activity

Covering the costs of hiring engineers and designers should be considered.

Knowledge-based Estonia 2002-2006 created an obligation for the Estonian State to develop technology programs in three key fields of activity (info technology, biotechnology, and nanotechnology). To date this has not happened, and instead a whole range of horizontal measures (for instance, technology development centres, doctoral schools, programs supporting the mobility of scientists, measures supporting R&D projects, etc.) has been created. Essentially the setting of priorities has been abandoned and all activities for the direction of development have been left to be decided by the competition in each field of activity. The positive effect of such a scheme on the Estonian economy can only be incidental, not systematic. Therefore, the authors believe that the creation of technology programs in key field of activity should be revived. One of the primary operating principles of technology programs must be cooperation between middle- and high-technology companies. The long-term development prospects of existing companies can only rest with the development of key fields of activity. If Estonia is not able to substantially increase the competence of existing companies and R&D in these fields of activity within the next 10 years, then there is essentially absolutely no hope for sustainable and balanced domestic development.

Cooperation should be encouraged with all support instruments.

Although the entrepreneurs also indicated problems in some other areas (i.e. the lack of financing instruments, which, according to the interviews conducted, consist of problems in obtaining overdrafts), it is the authors' assessment that the systematic and long-term implementation of the aforementioned measures would solve many problems relating financing and lack of markets. The need for more specific measures would be clarified by the proposed involvement of entrepreneurs in policy-making processes.

The creation of the technology programs in key fields of activity should be revived.

17 – A selection of examples is presented in the appendixes of the full text of the analyses, see the webpage of PRAXIS Center for Policy Studies, www.praxis.ee.

Published in English:

8/2004 Gender Wage Gap in Estonia

Authors: Tairi Rõõm, Epp Kallaste

The aim of the study is to assess the gender pay gap in Estonia and its causes. The reasons leading to differences in pay levels, such as personal characteristics and job characteristics, are examined on the basis of Estonian Labour Force Survey Data from 1998-2000. The analysis utilizes both descriptive and econometric tools. The results of the study indicate that in 1998-2000 women earned on average 72.7% of the pay of men. One third of the pay gap can be explained by differences in human capital and job characteristics, two thirds of the pay gap remain unexplained with observed factors.

4/2002 Digital Divide in Estonia and How to Bridge It. Executive Summary

Authors: Mari Kalkun (Emor), Tarmo Kalvet (PRAXIS)

The study focuses on social aspects of information and communication technology use in Estonia. The issue of digital divide has not enjoyed much attention, although several empirical surveys indicate that the problem does exist in the country. There exist certain groups of the population who do not use the Internet at all. At the same time, it is obvious that information technology can help raise productivity. Hence, it will be paramount to tackle the problem of digital divide more than has been until now. The authors make policy recommendations for popularising information and communication technology in order to encourage computer and Internet use among Estonian population.

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